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INTRODUCTION

The Bottomfish and Seamount Groundfish Fishery Management Plan (FMP) of the Western Pacific Regional Fishery Management Council (Council) calls for an annual report composed of a series of independent reports (modules) on the aspects of the fishery. This paper presents a module providing the estimated total volume of Hawaii's bottom fish fishery in 1987 and a long-term perspective on landings. The module also updates a more complete analysis of economic conditions presented in Pooley and Kawamoto (1988), which used 1984-86 data. Information on the fishery's biological status (including species identification) and a variety of operational considerations are contained in Ralston and Kawamoto (1988); information on American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands is contained in Hamm and Quach (1988).

RECENT DEVELOPMENTS

The Hawaii deep-sea handline fishery for snappers, groupers, and jacks continued to grow in 1987 although the growth rate apparently leveled off. The fresh fish market for bottom fish remained extremely strong, but because of limited supply, exports of bottom fish did not match the growth in the tuna export market. Imports of bottom fish to Hawaii also were higher in 1987. Many of these fish were purchased by local wholesalers directly from foreign countries and often exported to the mainland United States without going through the usual Honolulu market channels.

Although the recorded number of "active" vessels in the Northwestern Hawaiian Islands (NWHI) bottom fish fishery continued to grow in 1987 (from 24 vessels in 1986 to 28 in 1987), by year's end, only 8 vessels were fishing full time for bottom fish. The other vessels that landed NWHI bottom fish were engaged in other fisheries as their primary target. The multifishery fleet, which includes tuna longliners and albacore trollers, accounted for 7 of the 20 other vessels. Another seven vessels dropped out of the NWHI bottom fish fishery entirely. Switching to another fishery, primarily lobster trapping, accounted for three more vessels. Two vessels continued to target bottom fish on a part-time basis, and one vessel sank.

The motivations behind the decrease in the number of full-time vessels in the NWHI bottom fish fishery are diverse, but two of the main reasons appear to be that concentrations of bottom fish are more difficult to locate and other fisheries have become much more lucrative. Although revenue per trip increased in 1987 to \$17,500, annual revenue per active vessel declined (\$83,600) because most vessels made fewer trips in the bottom fish fishery. Many of the more successful bottom fishing vessels switched to longline tuna fishing in 1987. Market prices for Hawaii's longline-caught tuna skyrocketed during the last quarter of 1987 as exports to Japan were redeveloped. This, combined with good conditions in the established spiny and slipper lobster fishery and the promising developments in the deep-sea shrimp fishery, has posed a strong incentive for traditional bottom fish captains to shift some or all of their effort to these alternative fisheries.

Early in 1988, the Council approved a plan for limited entry in the NWHI bottom fishery. The plan is path breaking in a number of ways, but its approval by the National Marine Fisheries Service (NMFS) headquarters is not assured. If implemented, the limited entry plan will provide a moratorium on entry into the fishery until conditions for renewed entry are established and will provide for exit from the fishery for vessels that do not take at least three trips per year. The limited entry plan was strongly supported by the fishing industry when it was initiated in 1984 and 1985. However, during the ensuing years when the character of the fishery changed from a full-time, directed fishery to a mixed or part-time fishery, many in the industry began questioning the relevance of limited entry. On the other hand, fishery managers and many of the scientists involved in research on Hawaii's bottom fish have argued that the limited entry plan is the least intrusive means of protecting the fishery in the context of the limited biological and economic information on the fishery.

HAWAII BOTTOM FISH MARKET

The bottom fish fishery in Hawaii is monitored in two ways: through records of the State of Hawaii Division of Aquatic Resources' (HDAR) commercial fishing reports and the NMFS's wholesale market monitoring program (conducted by the Fishery Management Research Program of the Honolulu Laboratory). Both systems have significant limitations. We believe the HDAR data system undercounts landings in Hawaii because of reporting problems, whereas the NMFS monitoring system is limited to a sample of total landings which must be extrapolated. The NMFS data used in this report are scaled to our estimate of total market quantities, based on previous wholesale market research. The scaling factors are confidential because of the limited number of sources from which NMFS's samples are taken. These factors range from one (indicating zero scaling) to two (representing a doubling of our sample).

The NMFS estimates of recent trends for bottom fish sales in Hawaii (Table 1; Fig. 1) show a significant increase in landings in Hawaii in 1987 and a 12.5% annual growth rate since 1984. All three segments of the Hawaii bottom fish market (landings in the NWHI and the main Hawaiian Islands (MHI) and imports) have grown over the past 4 yr, according to our estimates.

The HDAR data on Hawaii landings (Table 2; Figs. 1-2) show a peak in 1986, but the most dramatic growth occurred between 1974 and 1984 (17% annual growth rate). The HDAR data (preliminary monthly reports) suggest a decline in Hawaii landings for 1987, whereas the NMFS wholesale market monitoring estimates show an increase. This difference could reflect a number of reporting, adjusting, sampling, and estimating problems which cannot be resolved yet.

Opakapaka and onaga (large snappers) continue to comprise the largest percentage of landings in the NWHI and MHI fisheries, while hapuupuu (sea bass) is another large proportion of the NWHI fishery and uluas (jacks) comprise a secondary proportion of both fisheries (Table 3; Fig. 3).

The long-term species composition for all areas in Hawaii based on HDAR data is shown in Figure 4. Values for bottom fish landings refer to the management unit species defined in the EMP, of which five species comprise about 85% of the total.

The economic value of Hawaii's bottom fish market has grown with landings over the past 2 yr (1987 and 1986), both in terms of gross revenue and average prices (Tables 4 and 5). Distribution of bottom fish sales by source is shown in Figure 5. The NWHI segment of the market has shown volume growth over the past 4 yr. The price distribution between NWHI, MHI, and imported fish is shown in Table 5, with quality premiums rising for MHI bottom fish. Prices rose by 13% on average. Bottom fish landed from the MHI received 70% more per pound than NWHI bottom fish. Imports, with potentially 20% of the overall market, pose significant price competition to landings in Hawaii, especially for NWHI landings which have a shorter shelf life. The price premiums shown for MHI bottom fish, despite their smaller average size (cf. Ralston and Kawamoto 1988), continue to reward bottom fishing in the MHI.

BOTTOM FISH IMPORTS INTO HAWAII

The pattern of bottom fish imports to Hawaii over the past 4 yr is shown in Table 6 and Figure 6. Imports account for approximately 20% of the Hawaii market. There has been substantial growth (46% per annum growth rate) in total bottom fish imports from 1984 to 1987. Approximately 80% of the imports come from the tropical Pacific, with Fiji and Tonga being major suppliers. The remainder comes from Australia, Japan, New Zealand, and Taiwan and may not represent the same market niche as Hawaii and other tropical Pacific bottom fish. The data do not provide prices; however, if we applied our monitoring program's average imported bottom fish price, ignoring species composition and product form, then the 1987 imports would be worth about \$1.26 million.

No imports of snappers, groupers, or jacks were recorded from American Samoa, Guam, or the Commonwealth of the Northern Mariana Islands in 1987. Landings from American Samoa and Guam were recorded for previous years.

The import figures are derived from the NMFS Market News Service's annual summaries of fishery products imported to Hawaii. The data are compiled by the NMFS Western Pacific Program Office (WPPO) and are from the Food and Drug Administration (FDA) inspection program. These data provide a more complete species breakdown for Hawaii than do U.S. Customs data, but they are incomplete because only lots valued over \$1,000 are monitored and because invoices for lots pulled for inspection are not available for WPPO recording. The data cover all sources outside the U.S. Customs area, including American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. Furthermore, because of a minor sampling problem, annual totals for 1987 needed to be extrapolated. These summaries do not distinguish product form, whether round or fillet. However, in 1987, 94% of the snapper imported into Hawaii was in whole form (this does not include snapper brought to the State from the mainland United States). The data

refer only to fresh/frozen imports and not to any processed products. Not all of the imported bottom fish remain in Hawaii; some may be reexported to the mainland United States by local wholesalers and brokers.

NWHI FLEET OPERATIONS

Operational data are available for only the NWHI fishery. Participation and operating rates were relatively the same in 1987 as in 1986 (Table 7). The average number of trips per vessel decreased from six in 1986 to four in 1987, but the low average number of trips is somewhat misleading. The number of vessels that made five or less trips was 21 or 75% of the fleet in 1987 compared to 12 vessels or "only" 50% of the fleet in 1986. The effect of these part-time vessels can be seen in Figure 7, which shows the seasonal trend in landings. In 1987, bottom fishing trips peaked during the summer season when tuna was in greatest supply and tuna prices accordingly were lower. The Council's proposed limited entry plan also influenced some part-time bottom fishing vessels to take at least a few trips in order to meet proposed eligibility requirements for future participation.

MARKET AND FLEET RESEARCH

Research is proposed or ongoing in three topical areas: market monitoring, vessel costs in the NWHI fishery, and vessel costs in American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands. We are exploring the means for expanding the NMFS market sample size to include a wider number of wholesale outlets. We have proposed a new Hawaii-wide survey of all seafood markets to provide a new baseline for scaling market samples.

Beginning in late 1987, we began collecting information on the cost of fishing for NWHI bottom fish. Because the types of vessels participating in the fishery have changed dramatically over the past few years, this is now a more important but more difficult task than it previously was. We anticipate completing this data collection by mid-1988 and reporting the results in early 1989. In a cooperative project with the Council, we are initiating an operational analysis of the NWHI bottom fish fleet. Finally, also in cooperation with the Council, we are collecting information on the cost of bottom fishing in American Samoa, Guam, and the Commonwealth of the Northern Mariana Islands.

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Table 1.--The National Marine Fisheries Service's (NMFS) estimate^a of Hawaii bottom fish market volume, by source, 1984-87 (in thousands of pounds^b). NWHI = Northwestern Hawaiian Islands; MHI = main Hawaiian Islands.

Year	Total	Source			
		NWHI	MHI	Hawaii only	Imports ^c
1984	1,510	661	697	1,358	252
1985	1,913	922	727	1,649	264
1986	2,013	948	746	1,694	319
1987	2,353	1,017	852	1,869	484

^aThe NMFS estimates are based on market monitoring; data are scaled to estimate of total market quantities.

^bValues are reported in pounds, which is the industry standard in Hawaii. One pound equals 0.45 kg.

^cImport data from NMFS Market News Service reports.

Note: Figures may differ from other reports because of rounding, preliminary nature of some data, and reporting conventions. Table 1 differs from subsequent tables of NMFS estimates because of different reporting conventions for 1984 and 1985. The 4 yr of data in Table 1 are reported on a consistent basis.

Table 2.--Hawaii bottom fish landings, 1970-87, based on commercial landings reports of the Hawaii Division of Aquatic Resources (annual summaries).

Year	Pounds landed	Revenue	Price ^a
1970	339,502	239,564	2.01
1971	406,006	310,021	2.09
1972	402,173	363,238	2.39
1973	446,139	413,523	2.35
1974	405,864	417,066	2.36
1975	555,255	591,645	2.24
1976	557,835	692,434	2.48
1977	560,447	762,327	2.58
1978	738,070	1,098,093	2.63
1979	692,430	1,120,363	2.57
1980	710,063	1,077,861	2.16
1981	637,841	1,253,469	2.53
1982	746,060	1,587,992	2.58
1983	880,169	1,956,060	2.62
1984	1,028,867	2,376,500	2.64
1985	1,079,619	2,646,412	2.65
1986	1,121,067	2,791,173	2.62
1987 ^b	1,019,176	2,812,755	2.76

^aPrices calculated from pounds caught (not pounds sold) and adjusted to current values with the 1987 Honolulu consumer price index.

^bPreliminary data.

Table 3.--Species composition of Hawaii bottom fish catch, 1986 and 1987 (pounds landed). The data are from the market monitoring program of the National Marine Fisheries Service (NMFS). Data are scaled to the estimate of total market; imports are excluded from this table. Table 3 (as well as the subsequent tables of NMFS estimates) differs in total from Table 1 because of different reporting conventions.

Species	1987	1986
Opakapaka	630,800	485,300
Onaga	350,800	371,500
Ehu	97,400	85,800
Hapuupuu	240,400	245,600
Butaguchi (ulua)	222,400	177,600
Other	245,000	256,500
Total	1,786,800	1,622,300

Table 4.--Hawaii bottom fish market revenue, 1986 and 1987. The data are from the market monitoring program of the National Marine Fisheries Service (NMFS). The data are scaled to the estimate of total market.

Source	1987	1986
	(in million \$)	
Northwestern Hawaiian Islands	\$2.3	\$2.1
Main Hawaiian Islands	3.1	2.3
Hawaii subtotal	5.4	4.4
Imports ^a	1.3	0.8
Total	6.7	5.2

^aThe NMFS's market monitoring prices applied to NMFS Market News Service reports.

Table 5.--Price (per pound) distribution by species and product source for the Hawaii bottom fish market, 1986 and 1987. NWHI = Northwestern Hawaiian Islands; MHI = main Hawaiian Islands. The data are from the market monitoring program of the National Marine Fisheries Service. The data are scaled to the estimate of total market.

	1986			1987		
	Market ^a	NWHI	MHI	Market ^a	NWHI	MHI
Opakapaka	\$3.41	\$3.20	\$3.78	\$3.56	\$3.27	\$3.97
Onaga	3.93	3.13	4.39	4.70	3.24	5.12
Ehu	2.56	2.14	3.32	3.17	2.36	3.75
Hapuupuu	1.61	1.56	2.23	1.93	1.87	2.74
Butaguchi (ulua)	1.32	1.07	2.00	1.19	1.16	2.51
Other	2.43	2.39	2.26	2.42	2.11	2.55
Imports	2.38			2.67		
Hawaii only	2.83			3.10		
Total	2.78			3.02		

^aMarket prices include imports (not shown).

Table 6.--Bottom fish imports into Hawaii, 1984-87 (in pounds as reported to the Food and Drug Administration). Data were compiled from the National Marine Fisheries Service's Market News Service reports, with an extrapolation made for incomplete 1987 figures.

	1984	1985	1986	1987
Groupers	533	6,600	570	3,992
Jacks	1,102	22,301	44,047	9,144
Sea bass	0	169	4,059	11,893
Snappers	150,814	234,609	270,408	446,610
Total	152,449	263,679	319,084	471,640

Table 7.--Fishing activity of the bottom fish fleet in the Northwestern Hawaiian Islands, 1987 and 1986. Data are from the market monitoring program of the National Marine Fisheries Service.

	1987	1986
Vessels	28	24
Trips	134	163
Total days fished	938	978
Days fished/trip	7.0	6.0
Days traveled/trip	9.5	8.5
Days/trip	16.5	14.0
Catch per trip	6,239	4,900
(Bottom fish MUS)		
Revenue/trip	\$17,462	\$13,125
Trips/vessel	4.8	6.8
Revenue/vessel	\$83,571	\$87,500

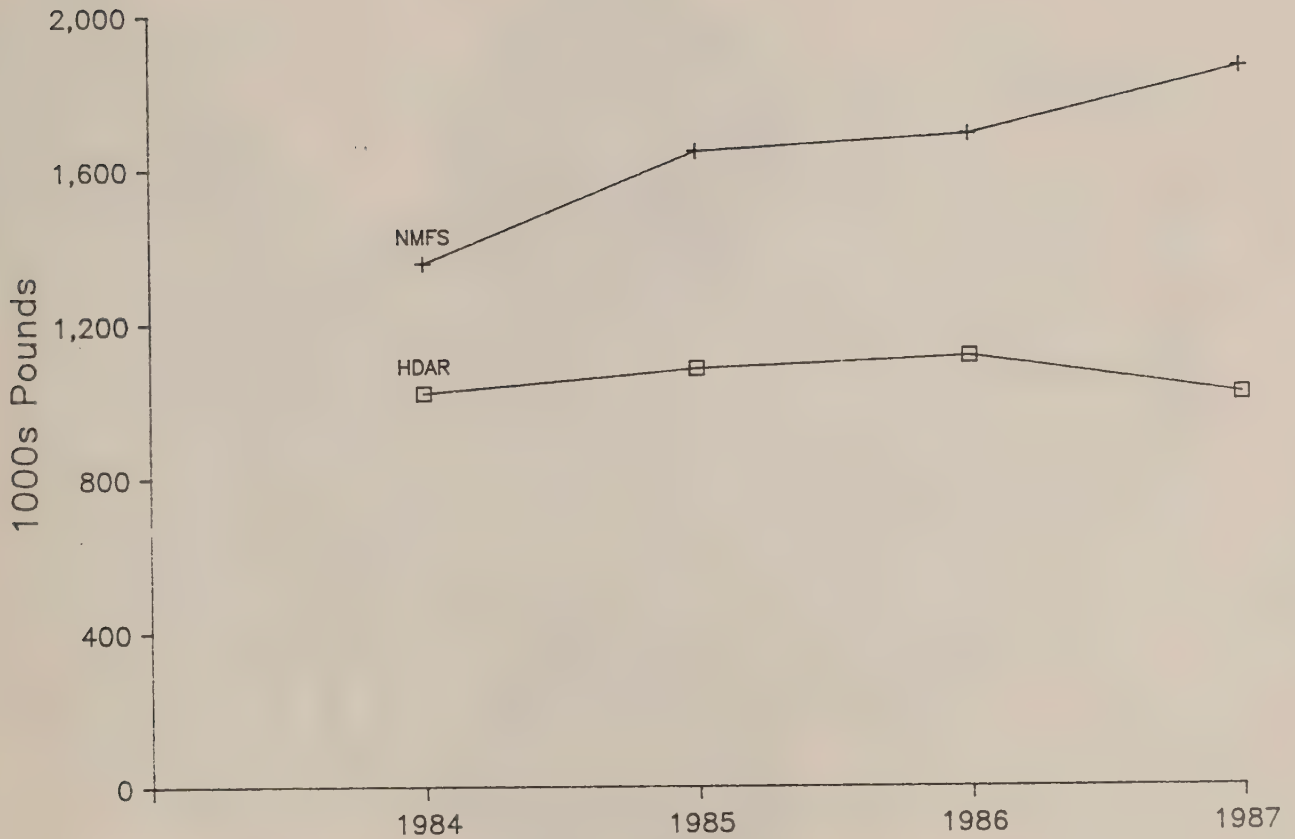


Figure 1.—Two estimates of Hawaii's bottom fish landings, 1984-87. Data are from the market monitoring program of the National Marine Fisheries Service and monthly reports of the Hawaii Division of Aquatic Resources.

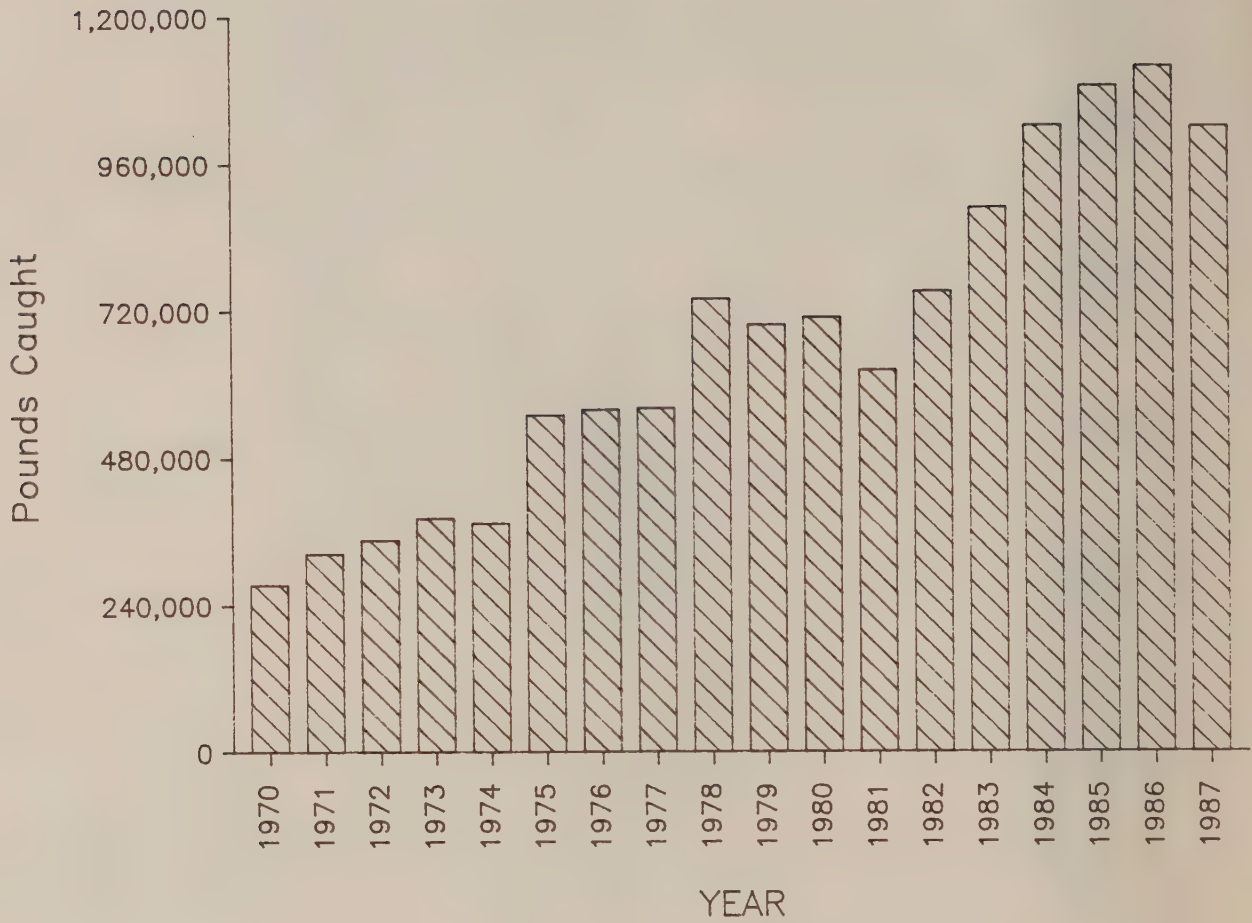
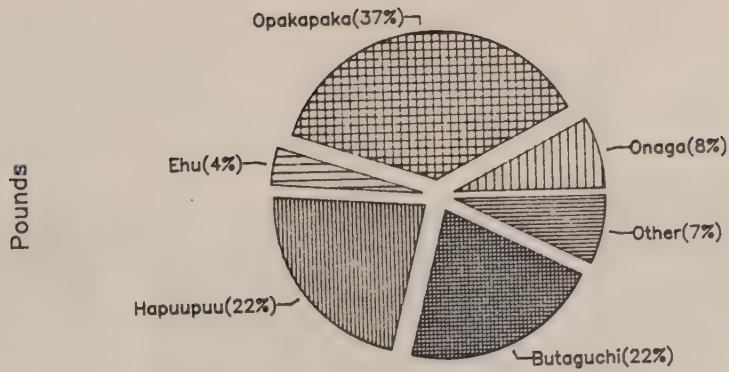
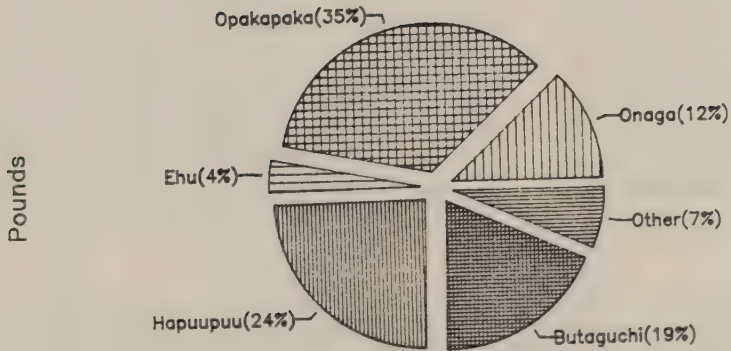


Figure 2.--Annual commercial catch of bottom fish in Hawaii, 1970-87. Data are from the annual reports of the Hawaii Division of Aquatic Resources.



1987



1986

Figure 3.--Species composition of the commercial bottom fish catch in the Northwestern Hawaiian Islands in 1987 and 1986, based on data from the market monitoring program of the National Marine Fisheries Service.

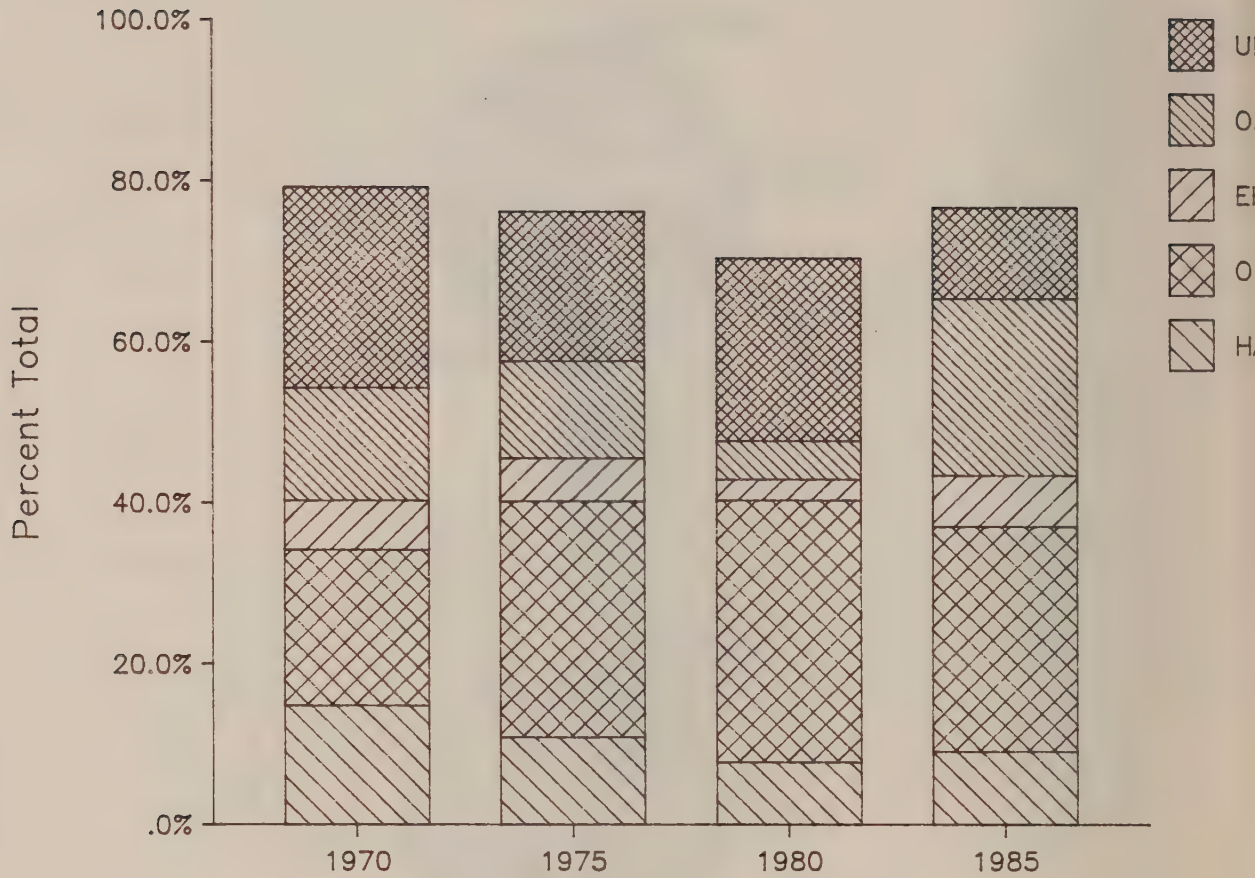


Figure 4.--Species composition of commercial bottom fish landings in Hawaii, 1970-85, based on annual reports of the Hawaii Division of Aquatic Resources.

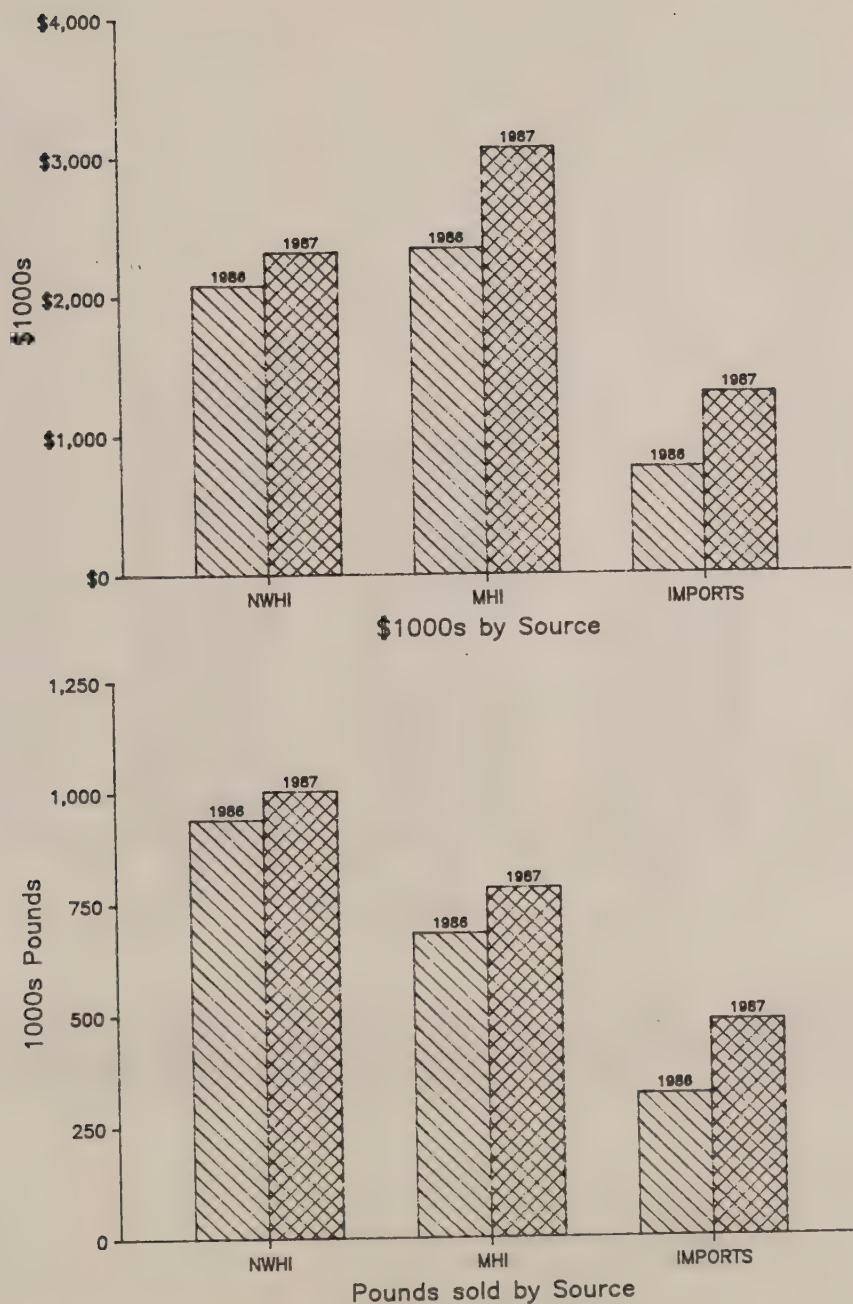


Figure 5.--Hawaii bottom fish market sales by source, 1987 and 1986. NWHI = Northwestern Hawaiian Islands; MHI = main Hawaiian Islands. Data are from the market monitoring program of the National Marine Fisheries Service.

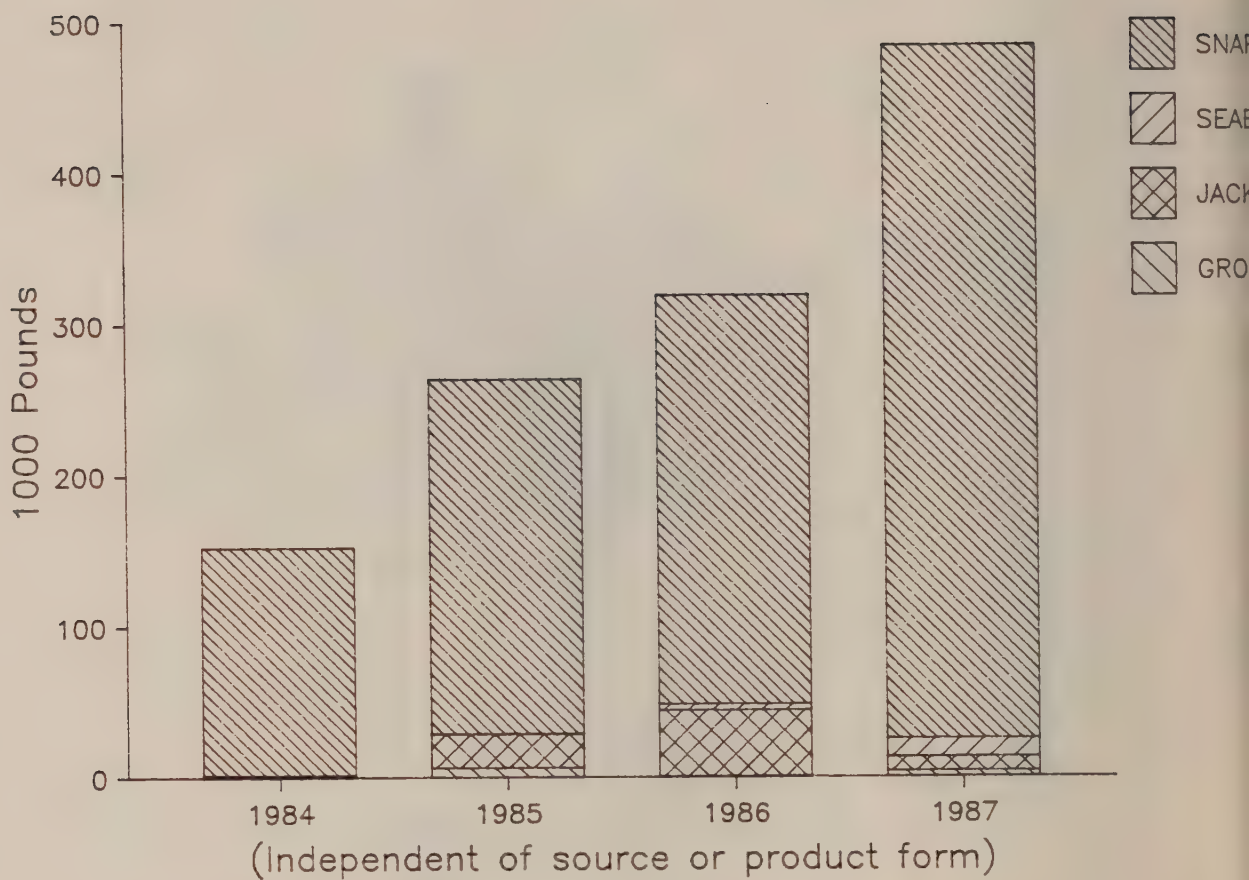


Figure 6.--Hawaii bottom fish imports, 1984-87. Data are based on the National Marine Fisheries Service's Market News Service reports from records of the U.S. Food and Drug Administration.

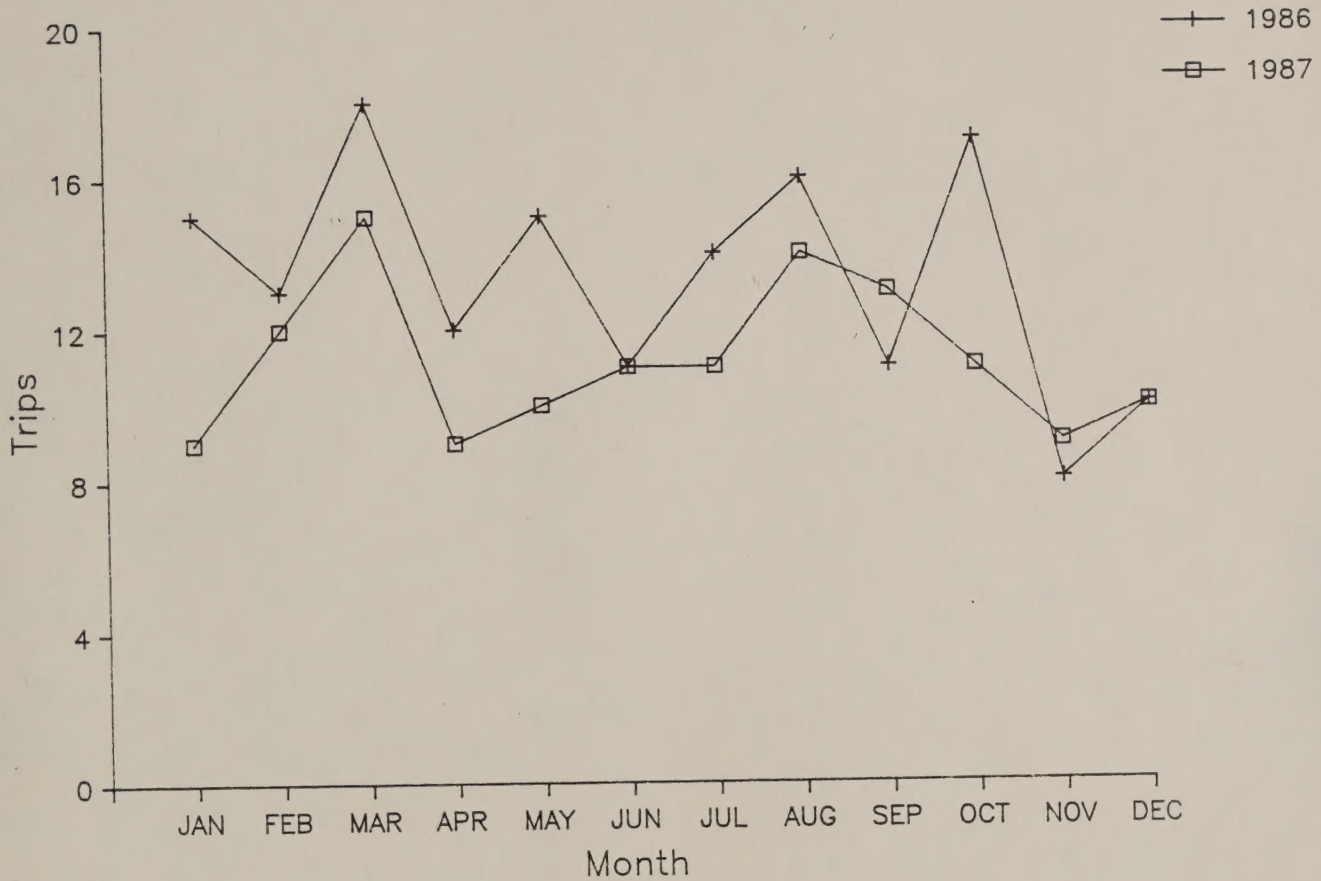


Figure 7.--Seasonal composition of bottom fishing trips in the Northwestern Hawaiian Islands, 1986 and 1987. Data are based on the market monitoring program of the National Marine Fisheries Service and by date of unloading.

